REMARKS

I. Status of the Application

Claims 24-28 and 30-59 are currently pending the present application. Claims 1-23, 25, 26, 29, and 48 have been cancelled. Claims 49-59 are withdrawn as non-elected groups pursuant to a restriction requirement. Claims 24-48 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Claims 25-27 and 41-45 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 24-48 stand rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-29 of U.S. Patent No. 6,632,459. Claims 24, 28, 30-32, 37-43, 45, and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Coudray et al. (Br. J. Nutrition, 1998; hereinafter "Coudray"). Claims 24, 28, 30-32, 37-43, 45, 47, and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Chekalinskaya et al. (Rastitel'nye Resursy, 1983 – CAPLUS Abstract; hereinafter "Chekalinskaya"). Claims 24, 28, 30-32, and 37-40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ameziane et al. (Bull. Soc. Chim. Fr., 1996; hereinafter "Ameziane"). Claims 24, 28, 30-32, 37-45, 47 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Coudray. Claims 24, 28, 30-32, 34, 35, 37-40, 47, and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy et al. (US 5,780,060; hereinafter "Levy"). Claims 24-48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Xu (US 6,083, 921), Squires (WO 98/11778), Carenzi et al. (US 5,080,906; hereinafter "Carenzi"), and the admitted state of the art.

Applicants have amended the claims to more clearly define and distinctly characterize Applicants' novel invention. Specifically, independent claim 24 has been amended, incorporating subject matter from dependent claim 48, to specify that the preparation for

stimulating or enhancing an immune system comprises a food product or a drink. Support for this amendment can be found throughout the specification as filed, for example from page 16, line 23 to page 17, line 19, which discloses that the preparation of invention may be processed into a drink or a food product. Accordingly, claim 48 has been cancelled. Claim 24 has also been amended, incorporating subject matter from claims 25 and 26, to recite at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the recited natural sources. Support for this amendment can be found throughout the specification as filed, for example from page 10, line 10 to page 11, line 21, and at page 13, lines 25-28. Accordingly, claims 25 and 26 have been cancelled and claim 27 has been amended to correct dependency. Claims 41-43 have been amended to correct formal matters. New claims 60 and 61 have been added. Support for these claims can be found throughout the specification as filed, for example from page 16, line 23 to page 17, line 19, which discloses that the preparation of invention may be processed into a drink or a food product; at page 3, lines 13-15, which discloses that the invention is related to a preparation for stimulating or enhancing an immune system that comprises one or more agents that stimulate T-lymphocytes *in vivo*; and in Table 1, which discloses the daily dose of chlorogenic acid and/or functional analogs thereof and also the daily dose of zinc (ionic). Support for at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the recited natural sources can be found throughout the specification as filed, for example from page 10, line 10 to page 11, line 21, and at page 13, lines 25-28. Support for claim 61 can also be found in Table 1 and at page 15, lines 5-8, which discloses a daily dose of 2-300 mg for chlorogenic acid and/or functional analogs thereof, and a daily dose of 50-2000 mg for N-acetylcysteine. New claim 62 has been added, support for which

can be found for example at page 11, lines 9-14 of the specification as filed. Accordingly, no new matter is believed to have been added.

Applicants respectfully request entry of the foregoing amendments and reconsideration of the present application in view of the following remarks, which are intended to place this application in condition for allowance.

II. Claims 24-28 and 30-48 Contain No New Matter

At page 3, third paragraph of the instant Office Action, claims 24-48 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner is of the opinion that the chlorogenic acid (or functional analog) to zinc ratios recited in claims 24 and 30-32 are new matter. Applicants respectfully traverse the rejection.

Support for the recited ratios can for example be found at page 15, Table 1 and lines 5-12 of the specification as filed. Regarding claim 24, the range of 0.0025 to 500 for the weight to weight ratio of chlorogenic acid and/or functional analogs (CA-compounds) to zinc are obtained from data disclosed in Table 1. Specifically, the skilled artisan reading Table 1 would arrive at the recited range by dividing the minimum daily dose of CA-compounds by the maximum daily dose of zinc (0.5 mg / 200 mg = 0.0025), and by dividing the maximum daily dose of CA-compounds by the minimum daily dose of zinc (500 mg / 1 mg = 500). Regarding claims 30-32, the recited ranges for the CA-compound to zinc ratio are also supported by data disclosed in Table 1. Specifically, for claim 30, the lower limit of 0.0025 is supported in the same manner as for claim 24, and the upper limit of 2.5 is given by dividing the maximum daily dose of CA-compounds by the maximum daily dose of zinc (500 mg / 200 mg = 2.5). For claim 31, the lower limit of 0.5 is given by dividing the minimum daily dose of CA-compounds by the minimum daily dose of zinc (0.5 mg / 1 mg = 0.5), and the upper limit of 2.5 is supported in the

same manner as for claim 30. For claim 32, the lower limit of 0.5 is supported in the same manner as for claim 31, and the upper limit of 500 is supported in the same manner as for claim 24.

For at least the foregoing reasons, the specification as filed does provide written description for the claims and so the claims contain no new matter. Accordingly, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 112, first paragraph rejection and allowance of claims 24-28 and 30-48.

III. Claims 25-27 and 41-45 Are Definite

At page 4, third paragraph of the instant Office Action, claims 25-27 and 41-45 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 25 and 26 have been cancelled, so the rejection against claims 25-27 is moot. Applicants have adopted the Examiner's suggestion to amend claims 41 and 43 to recite "further comprising." Thus, claims 41-45 should be clear and definite. Accordingly, Applicants respectfully request reconsideration and withdrawal of the 35 U.S.C. § 112, second paragraph rejection and allowance of claims 27 and 41-45.

IV. Double Patenting

At page 5, second paragraph of the instant Office Action, claims 24-48 stand rejected on the ground of nonstatutory obviousness-type double patenting over claims 1-29 of U.S. Patent No. 6,632,459. Applicants respectfully traverse the rejection. The subject claims are directed to a preparation comprising zinc and chlorogenic acid and/or functional analogs thereof, whereas the claims of US 6,632,459 are directed to a preparation comprising N-acetylcysteine and chlorogenic acid and/or functional analogs thereof. Nevertheless, Applicants are submitting

herewith a terminal disclaimer to obviate the rejection. Accordingly, Applicants respectfully request withdrawal of the nonstatutory obviousness-type double patenting rejection and allowance of claims 24, 27, 28 and 30-47.

V. Claims 24, 28, 30-32, 37-43, and 45 Are Novel over Coudray

At page 5, second to last paragraph, of the instant Office Action, claims 24, 28, 30-32, 37-43, 45 and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Coudray. Applicants respectfully traverse the rejection. Claim 48 has been cancelled, so the rejection against it is moot.

Amended independent claim 24 is directed to a preparation for stimulating or enhancing an immune system, comprising a food product or a drink comprised of zinc, at least one agent selected from the group consisting of chlorogenic acid and functional analogs thereof, said agent stimulating T-lymphocytes *in vivo*, and at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from *Echinacea* species, *Thuja occidentalis, Panax ginseng,* fungi, *Aranica montana* cell cultures, *Plantago spp, Achyrocline satureioides, Aconitum officinalis, Angelica acutiloba, Aristolochia officinalis, Astralagus gummerifa, A. membranaceus, A. mongholicus, Avena sativa, Banbusa vulgaris, Baptista tinctoria, Bryonia dioica, Calendula officinalis, Carthamus tinctorius, Chamomilla recutita, Echinacea angustifolia, E. pallida, E. purpurea, Eleutherococcus senticosus, Eupatorium cannabrinum, Silene vulgaris, Triticum sativum, Vincetoxicum officinalis, and Viscum album*, wherein the weight to weight ratio of chlorogenic acid and functional analogs thereof to zinc is in the range of 0.0025 to 500.

Coudray fails to disclose a food product comprising at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the recited species. Thus, Coudray fails to teach or suggest each and every limitation of independent claim 24 and its dependent claims. For at least this reason, claims 24, 28, 30-32, 37-43 and 45 are novel over Coudray. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection and allowance of claims 24, 28, 30-32, 37-43 and 45.

VI. Claims 24, 28, 30-32, 37-43, 45, and 47 Are Novel over Chekalinskaya

At page 6, third paragraph of the instant Office Action, claims 24, 28, 30-32, 37-43, 45, 47, and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Chekalinskaya. Applicants respectfully traverse the rejection. Claim 48 has been cancelled, so the rejection against it is moot.

The Examiner is of the opinion that such a fruit (food product) as disclosed by Chekalinskaya would inherently comprise naturally-occurring polysaccharides therein. However, Chekalinskaya fails to disclose a food product comprising at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the species recited in amended claim 24. Chekalinskaya is directed to *Oxycoccus palustris* and *Oxycoccus macrocarpus*, neither of which is among the species recited in claim 24.

In addition, Chekalinskaya fails to disclose a weight to weight ratio of chlorogenic acid and functional analogs thereof to zinc is in the range of 0.0025 to 500, as recited in claim 24. Chekalinskaya discloses amounts of chlorogenic acid in units of mg/100 g fresh fruit, and amounts of zinc in units of mg/kg dry weight. Chekalinskaya does not teach a way to convert grams of fresh fruit to kilograms of dry weight, or vice versa. Fresh fruit has water in it, so a unit

of fresh fruit would not equal a unit of dry weight (with water removed). Without a way to convert units so that the units of chlorogenic acid match the units of zinc, one of ordinary skill in the art would not be able to compare the amounts of chlorogenic acid and zinc to obtain a weight to weight ratio as recited in independent claim 24 and dependent claims 30-32.

For at least the above reasons, Chekalinskaya fails to teach or suggest each and every limitation of independent claim 24 and its dependent claims. Thus, claims 24, 28, 30-32, 37-43, 45, and 47 are novel over Chekalinskaya. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection and allowance of claims 24, 28, 30-32, 37-43, 45, and 47.

VII. Claims 24, 28, 30-32, and 37-40 Are Novel over Ameziane

At page 6, last paragraph of the instant Office Action, claims 24, 28, 30-32, and 37-40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ameziane. Applicants respectfully traverse the rejection.

Ameziane is a thermodynamic model study which has nothing to do with preparations for stimulating or enhancing the immune system. Ameziane fails to disclose a food product or a drink, as recited in amended claim 24. The solutions of Ameziane are for laboratory use only, and are not suitable for consumption by humans or animals. Ameziane also fails to disclose a food product or drink comprising at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the species recited in claim 24.

For at least the above reasons, Ameziane fails to teach or suggest each and every limitation of independent claim 24 and its dependent claims. Thus, claims 24, 28, 30-32, and 37-

40 are novel over Ameziane. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 102(b) rejection and allowance of claims 24, 28, 30-32, and 37-40.

VIII. Claims 24, 28, 30-32, 37-45, and 47 Are Patentable over Coudray

At page 7, second to last paragraph of the instant Office Action, claims 24, 28, 30-32, 37-45, 47 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Coudray. Applicants respectfully traverse the rejection. Claim 48 has been cancelled, so the rejection against it is moot.

As submitted in section V above, Coudray fails to teach or suggest each and every limitation of independent claim 24 and its dependent claims, because Coudray fails to disclose a food product comprising at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the species recited in claim 24. The skilled artisan would not be motivated to modify Coudray to include polysaccharides which are capable of inducing interferon-gamma production, because the dietary food preparation of Coudray is not intended to stimulate or enhance an immune system. Coudray is concerned with studying the ability of chlorogenic acid to bind and prevent the absorption of zinc in the digestive tract. There is no suggestion in Coudray that would lead the skilled artisan to the idea making a preparation for enhancing or stimulating an immune system comprising a food product or drink comprised of chlorogenic acid, zinc and at least one of the polysaccharides recited in claim 24. Thus, independent claim 24 and its dependent claims are not obvious over Coudray. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 24, 28, 30-32, 37-45, and 47.

IX. Claims 24, 28, 30-32, 34, 35, 37-40, and 47 Are Patentable over Levy

At page 8, second paragraph of the instant Office Action, claims 24, 28, 30-32, 34, 35, 37-40, 47, and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Levy. Applicants respectfully traverse the rejection. Claim 48 has been cancelled, so the rejection against it is moot.

Levy describes microcapsules comprising a wall formed of at least one plant flavenoid interfacially crosslinked by a diacid halide crosslinking agent. Chlorogenic acid is merely one component in an extensive list of plant polyphenols from which the microcapsule wall may be formed (column 3, lines 43-48, column 4, lines 1-63). Contrary to the Examiner's opinion, column 4, lines 1-19 of Levy does not teach that chlorogenic acid is present in the microcapsules. Levy teaches that chlorogenic acid is one of many plant polyphenols which may be crosslinked to form the walls of microcapsules. Chlorogenic acid that has been crosslinked with a crosslinking agent is not the same compound as chlorogenic acid, just as polyethylene is not the same compound as its monomer, ethylene. By polymerization (or crosslinking), a new compound is formed. Thus, Levy does not teach chlorogenic acid in the microcapsules. Nor does Levy provide motivation to include non-crosslinked chlorogenic acid in its preparation, because Levy is specifically directed to methods for overcoming problems associated with monomeric polyphenols (column 1, lines 39-54).

The Examiner may wish to argue that crosslinked chlorogenic acid is a functional analog of chlorogenic acid, but this is not taught or suggested by Levy. Levy discloses that plant polyphenols crosslinked into microcapsule walls retain an anti-free radical activity of substantially the same magnitude as non-crosslinked plant polyphenols (Example 37, note that crosslinked chlorogenic acid is not included in the Examples). However, retained anti-free

radical activity does not equate with retained ability to stimulate T-lymphocyte proliferation *in vivo*. Levy in no way teaches or suggests that crosslinked chlorogenic acid also retains T-lymphocyte, or even immune system, stimulating activity. It may well be that T-lymphocytes are only stimulated by chlorogenic acid as a small molecule (for example, by fitting into a receptor), and a polymerized or crosslinked version would not have the same activity (for example, the crosslinked version may be the wrong shape to fit into a receptor). Thus, Levy does not teach or suggest to the skilled artisan that crosslinked chlorogenic acid is a functional analog of chlorogenic acid for the purpose of stimulating T-lymphocytes *in vivo*.

The Examiner is of the opinion that it would be obvious to the skilled artisan to provide an oral tablet or capsule formulation comprising chlorogenic acid and a zinc compound based upon the beneficial teachings of Levy. However, as submitted above, Levy fails to teach a preparation comprising chlorogenic acid or a functional analog thereof which stimulates T-lymphocytes *in vivo*. Levy also fails to teach or suggest a food product or drink which comprises zinc oxide. Levy teaches that microcapsules may incorporate zinc oxide as one of several possible mineral substances which reflect solar radiation (column 5, lines 41-45). Since Levy teaches that the purpose of including zinc oxide is to reflect solar radiation, the skilled artisan would understand that zinc oxide is to be included in microcapsules for a dermatological or cosmetic product as a sunscreen. The skilled artisan would not be motivated to include a mineral substance which reflects solar radiation into microcapsules for oral administration as a food product or drink.

The Examiner is of the opinion that it would be a matter of routine optimization to determine the appropriate amount of chlorogenic acid and zinc oxide. But this is not the case because there is no suggestion in Levy to use chlorogenic acid or zinc to provide a preparation

for enhancing or stimulating the immune system, let alone to use both in combination. The chlorogenic acid is crosslinked to prepare the shells of microcapsules, and is also used as a free radical scavenger. Zinc is only mentioned as a reflector of solar radiation. Suitable ratios of chlorogenic acid and zinc for these purposes have no predictive value for suitable ratios for the purpose of enhancing or stimulating an immune system, which is the purpose underlying the claimed invention. Thus, the skilled artisan would find no motivation from Levy to provide chlorogenic acid and zinc in a ratio suitable for enhancing or stimulating the immune system, as defined in the present claims.

In addition, Levy fails to teach or suggest a food product or drink comprising at least one polysaccharide selected from the group consisting of β-1,3-glucans, arabinogalactans, and polysaccharides isolated from the species recited in amended claim 24. Nor does Levy provide motivation to modify its teachings to include the recited polysaccharides, because Levy is not directed to preparations for stimulating or enhancing an immune system.

For at least the above reasons, Levy fails to teach or suggest each and every limitation of independent claim 24 and its dependent claims, and Levy also fails to provide motivation to modify its teachings to arrive at the subject claims. Therefore, claims 24, 28, 30-32, 34, 35, 37-40, and 47 are not obvious over Levy. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 24, 28, 30-32, 34, 35, 37-40, and 47.

X. Claims 24, 27, 28, and 30-47 Are Patentable over Xu, Squires, Carenzi, and the State of the Art

At page 8, last paragraph of the instant Office Action, claims 24-48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Xu, Squires, Carenzi, and the state of the art.

Applicants respectfully traverse the rejection. Claims 25, 26, and 48 have been cancelled, so the rejection against them is moot.

The Examiner asserts that Xu teaches an immunomodulating pharmaceutical composition which comprises chlorogenic acid and zinc stearate. Xu teaches the inclusion of zinc stearate as one of a long list of excipients (inactive ingredients) (column 11, lines 1-15) that can be included in tablet forms of the pharmaceutical composition. Zinc stearate is an organic zinc salt, not an inorganic zinc salt as recited in claims 34 and 35, nor is it zinc citrate as recited in claim 36. Since zinc stearate is taught by Xu to be an inactive ingredient, the skilled artisan would not be motivated to pick it out of the extensive list of other inactive ingredients to include it in a preparation for stimulating or enhancing an immune system, nor to include zinc stearate in the amounts and ratios with chlorogenic acid and functional analogs thereof recited in claims 24 and 30-33, and the skilled artisan would certainly not be motivated to include zinc stearate in an effective amount to be capable of inducing the production of interferon-gamma *in vivo*, as recited in claim 28. The Examiner is using impermissible hindsight based on Applicants' disclosure to cherrypick zinc stearate from a laundry list of inactive ingredients and to combine it with chlorogenic acid in the ratios recited. In addition, Xu makes no mention of the polysaccharides recited in the subject claims.

Squires and Carenzi fail to remedy the deficiencies of Xu. The Examiner asserts that Squires teaches an anti-viral, anti-microbial medicine comprising a functional analog of chlorogenic acid (1,5-o-dicaffeoylquinic acid), polysaccharides, vitamins, minerals, and plant extracts. However, the skilled artisan would understand an anti-microbial to be an agent that kills or inhibits the growth of microbes. The skilled artisan would not infer from the term "anti-microbial" an agent that modulates the immune system. Thus, Squires fails to teach or suggest a

preparation for stimulating or enhancing an immune system. Squires fails to disclose zinc. Squires also fails to disclose a food product or a drink. In fact, Squires teaches away from ingesting its medicine, teaching that the medicine may be contraindicated for ingestion since such use may produce irritation or chemical burns (page 16, lines 12-15). So the skilled artisan would certainly not be motivated to combine the topically administered anti-microbial medicine of Squires, or components thereof, with an orally administered immunomodulating composition of Xu to arrive at a preparation for stimulating or enhancing an immune system comprising a food product or drink.

The Examiner relies on Carenzi to teach N-acetylcysteine as an agent that generally stimulates the immune system. The Examiner states that no invention resides in combining old ingredients of known properties where the results obtained thereby are no more than the additive effect of the ingredients. However, Applicants have discovered that the combination of N-acetylcysteine as an interferon-gamma inducing agent (page 10, lines 10-11) in a preparation with chlorogenic acid or a functional analog thereof has a surprising synergistic effect in medical use (see page 11, line 21 to page 12, line 3). The unanticipated synergy of these combined agents would not be predicted based on any of the cited references. Thus, the subject claims are not obvious over the Examiner's combination of Xu, Squires, and Carenzi.

The Examiner is of the opinion that Applicants have admitted that instantly claimed ingredients are well known in the art to act as immuno-stimulating agents, however Applicants are simply describing the utility of the elements recited in the subject claims. The skilled artisan without the benefit of Applicants' disclosure would not be motivated to combine the separate elements into one preparation for stimulating or enhancing an immune system. The combination of chlorogenic acid and/or functional analogs thereof, which are capable of stimulating

T-lymphocytes, with elements capable of inducing cytokine release (specifically interferon-gamma), such as zinc and the recited polysaccharides, leads to a reduced cost-price for the preparation and improved organoleptic properties (specification page 9, line 28 to page 10, line 2). The prior art does not suggest that such results would be achieved by making the combination suggested by the Examiner.

For at least the foregoing reasons, the proposed combination Xu, Squires, Carenzi, and the state of the art fails to teach or suggest each and every claim limitation and also fails to provide motivation to combine the references, and so the subject claims are not obvious over the proposed combination. Accordingly, Applicants respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection and allowance of claims 24, 27, 28, and 30-47.

XI. Conclusion

Having addressed all outstanding issues, Applicants respectfully request reconsideration and allowance of claims 24, 27, 28, and 30-47, and consideration and allowance of claims 60-62. To the extent the Examiner believes that it would facilitate allowance of the case, the Examiner is requested to telephone the undersigned at the number below.

Respectfully submitted,

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